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EXAMINER	
HOLLIDAY, JAIME MICHELE	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/821,143	LI, SHAOLIN	
	Examiner	Art Unit	
	JAIME M. HOLLIDAY	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _6/18/2010_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-62_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _1-20, 43-54, 61 and 62_ is/are allowed.

6)☒ Claim(s) _21-42 and 55-60_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Response to Arguments

1. Applicant's arguments with respect to claims 21-42 and 55-60 have been considered but are moot in view of the new ground(s) of rejection.

Terminal Disclaimer

2. The terminal disclaimer filed on June 18, 2010 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US 7,646,744 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Allowable Subject Matter

3. The indicated allowability of claims 25-29, 33, 36, 38-42 and 55-60 is withdrawn in view of the newly discovered reference(s) to Schmidt (US 2006/0268777 A1). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. **Claims 21, 22, 25, 29, 30, 33-35, 38, 42 and 55-60** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jia et al. (US 7,103,325 B1)** in view of **Schmidt (US 2006/0268777 A1)**.

Consider **claims 21 and 34**, Jia et al. clearly show and disclose first mode and second mode (a space-time encoding mode is selected to use when transmitting with spatial diversity based on the receive diversity associated with a receiver device and the quality of the transmission channels based on information fed back from the receiver device; selectable space-time encoding modes are preferably space-time transmit diversity encoding and a version of BLAST-type encoding [col. 2 lines 33-40]); An apparatus (communication system) comprising: a multi-antenna signal processing circuit (base station generally includes a control system, a baseband processor, transmit circuitry, receive circuitry, multiple antennas, and a network interface [col. 3 line 67- col. 4 lines 6]); a first baseband processor configured to operate with the multi-antenna signal processing circuit, the first baseband processor configured to handle data transmissions in a first mode; and the multi-antenna signal processor configured to handle data transmissions in a second mode (the receive circuitry receives radio frequency signals through antennas bearing information from one or more remote transmitters provided by mobile terminals. The baseband processor processes the digitized received signal to extract the information or data bits conveyed in the received signal. The multiple antennas and the replicated

transmit and receive circuitries provide spatial diversity [col. 3 line 67- col. 4 lines 6, 14-18, and 37-39]).

However, Jia et al. fail to specifically disclose the baseband processor operated without the multi-antenna signal processing circuit.

In the same field of endeavor, Schmidt clearly shows and discloses wherein the baseband processor (processor core **150**) is configured to handle data transmissions during the first mode without multi-antenna signal processing (short range wireless transceiver core **130**) by the multi-antenna signal processing circuit (When the multi-mode wireless communicator device 100 is in the cellular telephone connection mode, the short-range wireless transceiver core 130 is powered down to save power [fig. 1, paragraphs 28, 32] wherein the wireless devices includes multiple antennas (see fig. 1); and the processor core processes both Bluetooth and cellular signals);

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to selectively power down portions of the wireless device based on communication as taught by Schmidt in the system of Jia et al., in order to optimize communication efficiency between communicating devices over varying channel conditions (Jia et al.; col. 2 lines 25-30).

Consider **claim 22**, Jia et al., as modified by Schmidt, clearly show and disclose the claimed invention **as applied to claim 21 above**, and in addition, Jia et al. further discloses that a base station controller controls wireless communications within multiple cells which are served by corresponding base

stations. The base station, reading on the claimed "first and second access points," generally includes a control system, a baseband processor, transmit circuitry, receive circuitry, multiple antennas and a network interface. The receive circuitry receives radio frequency signals through antennas bearing information from one or more remote transmitters provided by mobile terminals. The baseband processor processes the digitized received signal to extract the information or data bits conveyed in the received signal. The multiple antennas and the replicated transmit and receive circuitries provide spatial diversity, (col. 3 lines 50-55, 67- col. 4 lines 6, 14-18, and 37-39). The selectable space-time encoding modes are preferably space-time transmit diversity encoding and a version of BLAST-type encoding, reading on the claimed "a first access point capable of transmitting and receiving data in a first mode or a second mode, or combinations thereof; a second access point capable of transmitting or receiving data in a first mode or a second mode, or combinations thereof; the first baseband processor further capable of handling data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition; and the multi-antenna signal processor further capable of handling data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition," (fig. 1, col. 2 lines 33-40).

Consider **claims 25 and 38**, Jia et al., as modified by Schmidt, clearly show and disclose the claimed invention **as applied to claims 21 and 35 above**,

respectively, and in addition, Jia et al. further discloses that the receive circuitry receives radio frequency signals through antennas bearing information from one or more remote transmitters provided by mobile terminals. The baseband processor processes the digitized received signal to extract the information or data bits conveyed in the received signal. This processing typically comprises demodulation, decoding, and error correction operations, reading on the claimed "the multi-antenna signal processor is further capable of operating selectively with a first baseband processor to demodulate signals received in a channel from a second access point," (fig. 2, fig. 5, col. 3 line 67- col. 4 lines 6, 14-18, and 37-39).

Consider **claims 29 and 42**, Jia et al., as modified by Schmidt, clearly show and disclose the claimed invention **as applied to claims 21 and 34 above**, respectively, and in addition, Jia et al. further discloses that the base station, reading on the claimed "access point," generally includes a control system, a baseband processor, transmit circuitry, receive circuitry, multiple antennas, reading on the claimed "multi-antenna signal processing unit," and a network interface. The receive circuitry receives radio frequency signals through antennas bearing information from one or more remote transmitters provided by mobile terminals. The baseband processor processes the digitized received signal to extract the information or data bits conveyed in the received signal. The multiple antennas and the replicated transmit and receive circuitries provide spatial diversity, reading on the claimed "multi-antenna signal processor is

capable of operating with said baseband processor to receive or transmit signals in a channel between said first access point and said second access point," (col. 3 line 67- col. 4 lines 6, 14-18, and 37-39).

Consider **claim 30**, Jia et al. clearly show and disclose first mode and second mode (a space-time encoding mode is selected to use when transmitting with spatial diversity based on the receive diversity associated with a receiver device and the quality of the transmission channels based on information fed back from the receiver device; selectable space-time encoding modes are preferably space-time transmit diversity encoding and a version of BLAST-type encoding [col. 2 lines 33-40]); a multi-antenna access point circuit (base station generally includes a control system, a baseband processor, transmit circuitry, receive circuitry, multiple antennas, and a network interface [col. 3 line 67- col. 4 lines 6]); comprising: a baseband processor circuit configured to handle data transmissions during a first operating mode in a channel between a first access point and a second access point; and a multi-antenna signal processing circuit configured to handle data transmissions during a second operating mode in said channel; baseband processor configured to operate with the multi-antenna signal processing circuit (receive circuitry receives radio frequency signals through antennas bearing information from one or more remote transmitters provided by mobile terminals. The baseband processor processes the digitized received signal to extract the information or data bits conveyed in the received signal. The

multiple antennas and the replicated transmit and receive circuitries provide spatial diversity [col. 3 line 67- col. 4 lines 6, 14-18, and 37-39]).

However, Jia et al. fail to specifically disclose the baseband processor operated without the multi-antenna signal processing circuit.

In the same field of endeavor, Schmidt clearly shows and discloses wherein the baseband processor (processor core **150**) is configured to handle data transmissions during the first mode without multi-antenna signal processing (short range wireless transceiver core **130**) by the multi-antenna signal processing circuit (When the multi-mode wireless communicator device 100 is in the cellular telephone connection mode, the short-range wireless transceiver core 130 is powered down to save power [fig. 1, paragraphs 28, 32] wherein the wireless devices includes multiple antennas (see fig. 1); and the processor core processes both Bluetooth and cellular signals);

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to selectively power down portions of the wireless device based on communication as taught by Schmidt in the system of Jia et al., in order to optimize communication efficiency between communicating devices over varying channel conditions (Jia et al.; col. 2 lines 25-30).

Consider **claim 33**, Jia et al., as modified by Schmidt, clearly show and disclose the claimed invention **as applied to claim 30 above**, and in addition, Jia et al. further disclose that a space-time encoding mode is selected to use when transmitting with spatial diversity based on the receive diversity associated with a

receiver device and the quality of the transmission channels based on information fed back from the receiver device. The selectable space-time encoding modes are preferably space-time transmit diversity encoding and a version of BLAST-type encoding, reading on the claimed “the first operating mode or the second operating mode are selected by the multi-antenna access point circuit,” (col. 2 lines 33-40).

Consider **claim 35**, Jia et al., as modified by Schmidt, clearly show and disclose the claimed invention **as applied to claim 34 above**, and in addition, Jia et al. further discloses that a base station controller controls wireless communications within multiple cells which are served by corresponding base stations. In general, each base station facilitates communications with mobile terminals, which are within the cell associated with the corresponding base station. The base station, reading on the claimed “first and second access points,” generally includes a control system, a baseband processor, transmit circuitry, receive circuitry, multiple antennas and a network interface. The receive circuitry receives radio frequency signals through antennas bearing information from one or more remote transmitters provided by mobile terminals. The baseband processor processes the digitized received signal to extract the information or data bits conveyed in the received signal. The multiple antennas and the replicated transmit and receive circuitries provide spatial diversity, (col. 3 lines 50-60, 67- col. 4 lines 6, 14-18, and 37-39). The selectable space-time encoding modes are preferably space-time transmit diversity encoding and a

version of BLAST-type encoding, reading on the claimed "a mobile terminal capable of transmitting data to a first and/or second access point; the first access point capable of transmitting and receiving data in a first and/or second mode; the second access point capable of transmitting and receiving data in a first and/or second mode; the first baseband processor further capable of handling data transmissions in a first mode between said first access point and a second access point under a first channel transmission condition; and the multi-antenna signal processor further capable of handling data transmissions in a second mode between said first access point and said second access point under a second channel transmission condition," (fig. 1, col. 2 lines 33-40).

Consider **claims 55, 57 and 59**, Jia et al., as modified by Schmidt, clearly show and disclose the claimed invention **as applied to claims 21, 30 and 34 above**, respectively, and in addition, Schmidt further discloses wherein the multi-antenna signal processing circuit is further configured to operate in parallel with the first baseband processor (router takes this data-word and converts the stream into parallel streams that are not time-correlated so that the processors can operate in parallel [paragraphs 35, 36]).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to utilize multiple processors and separate a signal so the processors can operate in parallel as taught by Schmidt in the system of Jia et al., in order to efficiently operate a multi-mode wireless device.

Consider **claims 56, 58 and 60**, Jia et al., as modified by Schmidt, clearly show and disclose the claimed invention **as applied to claims 21, 30 and 34 above**, respectively, and in addition, Schmidt further discloses wherein the first baseband processor is configured to handle data transmissions in the first mode using a single antenna (reconfigurable processor core **150** controls the cellular radio core; cellular radio core includes a transmitter/receiver section that is connected to an off-chip antenna; when the multi-mode wireless communicator device is in the cellular telephone connection mode, the short-range wireless transceiver core is powered down [fig. 1, paragraphs 26, 27, 32]).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a processor core that controls the cellular antenna when operating in that mode as taught by Schmidt in the system of Jia et al., in order to efficiently operate a multi-mode wireless device.

2. **Claims 23, 24, 31, 32, 36 and 37** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jia et al. (US 7,103,325 B1)** in view of **Schmidt (US 2006/0268777 A1)**, and in further view of **Walton et al. (US 2004/0082356 A1)**.

Consider **claims 23, 24, 31, 32, 36 and 37**, and **as applied to claims 22, 30, 35 above**, respectively, Jia et al., as modified by Schmidt, clearly show and disclose the claimed invention except that that input signals are modulated using the channel matrix.

In the same field of endeavor, Walton et al. clearly show and disclose that multiple rates and transmission modes are supported by the MIMO WLAN system to attain high throughput when supported by the channel conditions and the capabilities of the user terminals. Different transmission modes may also be used, depending on the number of antennas at the user terminals and the channel conditions. Each transmission mode is associated with different spatial processing at the transmitter and receiver and may be selected for use under different operating conditions (paragraph 13). At access point **110**, the transmitted uplink signal(s) are received by antennas **724**, demodulated by demodulators **722**, and processed by an RX spatial processor **740** and an RX data processor **742**, reading on the claimed "the multi-antenna signal processor (multi-antenna signal processing circuit) is further capable of receiving M independent modulated input signals from the second access point if the second channel transmission condition exists between the first access point and the second access point," (paragraph 218). The access point precodes N_{ap} symbol streams to be sent to N_{ap} user terminals such that these symbol streams experience little cross-talk at the user terminals. The access point can form the channel response matrix for the N_{ap} selected user terminals and perform QR factorization on H_{mu}. The access point then precodes the N_{ap} data symbol streams with the matrix to obtain N_{ap} precoded symbol streams a, and further processes the precoded symbol streams with the unitary matrix to obtain the N_{ap} transmit symbol streams for transmission to the N_{ap} user terminals. Again, the

access point can also transmit a steered reference to each user terminal, reading on the claimed "the multi-antenna signal processor (multi-antenna signal processing circuit) is further capable of processing the M independent modulated input signals using a channel mixing matrix to extract N independent data signals transmitted by the second access point," (paragraph 327).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made use a channel matrix to process received and transmitted signals as taught by Walton et al. in the system of Jia et al., as modified by Schmidt, in order to obtain high throughput to multiple users (Walton et al.; paragraph 11).

3. **Claims 26, 27, 39 and 40** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jia et al. (US 7,103,325 B1)** in view of **Schmidt (US 2006/0268777 A1)**, and in further view of **Bjorklund et al. (US 7,126,926 B1)**.

Consider **claims 26, 27, 39 and 40**, and **as applied to claims 21, 22 and 35 above**, respectively, Jia et al., as modified by Schmidt, clearly show and disclose the claimed invention except that the signals are 802.11 compatible.

In the same field of endeavor, Bjorklund et al. clearly show and disclose a device and system capable of communication using the RadPad network and the IEEE 802.11 protocol at the same time. A wired LAN is also connected to an IEEE 802.11 access point **1507**, which may utilize the Spectrum 24 network. A multiple use device **1515** containing a RadPad antenna **1590** and a IEEE 802.11

antenna **1508** as well as ports for data/fax communication, infrared tO communication, communication using the RS-232 protocol, modem communication and printer communication is provided in the system. The multiple use device also uses the IEEE 802.11 antenna 1508 to communicate in a high speed, long range manner with the access point 1507 to access services on the wired LAN, which may include the use of the Internet for data and voice-over IP, reading on the claimed "multi-antenna signal processor is compatible with an IEEE 802.11 type standard; the first baseband processor is further capable of handling data transmissions in a first mode between the first and second access points in accordance with an IEEE 802.11 type protocol and the multi-antenna signal processor is capable of handling data transmissions in a second mode between said first access point and said second access point in accordance with an IEEE 802.11 type protocol," (col. 18 line 53- col. 19 line 9).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to communicate using the IEEE 802.11 standard as taught by Bjorklund et al. in the system of Jia et al., as modified by Schmidt, in order to communicate with multiple users using different applications (Bjorklund et al.; abstract).

4. **Claims 28 and 41** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jia et al. (US 7,103,325 B1)** in view of **Schmidt (US 2002/0132600 A1)**, and in further view of **Terry (US 7,046,651 B2)**.

Consider **claims 28 and 41**, and **as applied to claim 22 and 35 above**, respectively, Jia et al., as modified by Schmidt, clearly show and disclose the claimed invention except that a PCF is used according to the 802.11 protocol.

In the same field of endeavor, Terry clearly shows and discloses the 802.11 standard, wherein the PHY layer provides protocol for the hardware of WLANs termed stations or nodes. A station may be mobile station, wireless enabled laptop or desktop personal computer, and the like. The PHY layer concerns transmission of data between those stations, and there are currently four different types of PHY layers: direct sequence spread spectrum (DSSS) **22**, frequency-hopping spread spectrum (FHSS) **23**, infrared (IR) pulse modulation **24**, and orthogonal frequency-division multiplexing (OFDM). The MAC layer is a set of protocols that maintain order in the use of the shared bandwidth or medium, and the 802.11 standard specifies two modes of communication: a compulsory Distributed Coordination Function (DCF), and an optional Point Coordination Function (PCF), reading on the claimed "the multi-antenna signal processor is further capable of transmitting an RF modulated signal to the second access point using a point coordination function (PCF) mode associated with an IEEE 802.11 type protocol," (col. 1 lines 34-49).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to implement a DSSS frame structure in a 802.11 environment as taught by Terry in the system of Jia et al., as modified by

Schmidt, in order to use multiple layers to communicate between nodes and terminal.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAIME M. HOLLIDAY whose telephone number is (571)272-8618. The examiner can normally be reached on Monday through Friday 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Appiah can be reached on (571) 272-7904. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jaime M Holliday/
Examiner, Art Unit 2617

/Charles N. Appiah/
Supervisory Patent Examiner, Art Unit 2617